Performance Implications of Internet-based Information Technology in Value Chain Management

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ABSTRACT

Internet-based information technology (I-IT) has become an integral part of the value chain for many firms, increasing the efficiency of existing activities and enabling new modes of doing business. Despite a significant amount of research on I-IT, however, its exact impact on firm performance has yet to be resolved. This study examines multiple issues regarding the relationship between I-IT investment made in support of value chain management and organizational performance as judged by profit and productivity. Conclusions are offered regarding the strength of this type of investment as a performance predictor, the types of firms for which it does improve performance and what modes of I-IT investment produce the greatest results. Data from 165 firms indicate that investment in I-IT can positively impact performance depending on the type of industry and the type of supply chain function being supported. In particular, results indicate that firms in industries such as banking and insurance stand to benefit most from the use of I-IT. This study also provides useful recommendations for how firms should design and deploy their I-IT resources for value chain management that maximizes their return on investment. Due to the importance of the internet in global economic development, the implications of this study are significant.

Keywords: Information Technology, Internet, Resource Based, Transaction Cost, Value Chain

1. INTRODUCTION

Information technology (IT) has become an integral part of a firm’s effort to sustain competitive advantage or competitive parity based on the assumption that it adds economic value to a firm by improving its value chain management (Mata, Fuerst, & Barney, 1995). Despite the recent rash of dot-com failures at the turn of the century (Rasheed, 2009), current projections of growth in e-business worldwide indicate firms continue to seek opportunities to

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use the Internet as an application of information technology to develop virtual markets within the value chain framework. Providing a model that guides the development of I-IT can therefore have a significant impact on global economic development.

IT has been increasingly used in the business-to-business (b2b) realm of electronic commerce as the basis for inter-organizational information systems (IOS) that enable firms to transcend organizational boundaries, facilitate the flow of information, and manage linkages between suppliers and customers in the supply chain. As the proliferation of Internet-related information technology increases dramatically, it is imperative that theory relative to IOS in value chain management is expanded and applied to web-based electronic commerce. Recent findings reveal that performance measurement in the new supply chain era is still an open area of research (Goknur & Turan, 2010). They suggest a need for further research on framework development and performance measurement systems.

This study presents and tests a model for measuring the performance impact of Internet-based information technology used in supply chain activities. Based on extant organizational theory, information systems theory and resource dependency theory, a contextual model proposes that organizational performance is influenced by a firm’s organizational technology, system utilization, technology characteristics, and resource investment. This model is similar to Goodhue and Thompson’s (1995) model they referred to as the Technology-to-Performance Chain (TPC), in the sense that it presumes that there must be a fit between task and technology and that the technology must be utilized to maximize performance. However, this study extends this model in a number of ways. First it builds on the basic structure of the TPC model by requiring IT resource investment (Chatfield & Yetton, 2000; Li & Ye, 1999) and organization technology (Thompson, 1967; Stabell & Fjeldstad, 1998; Afuah & Tucci, 2000) as predictors of performance. The study being presented also extends this research stream to organizational performance, rather than individual performance and to Internet-based information technology, rather than EDI technology. After describing the theoretical framework which supports the proposed model, this paper will test these relationships with data from over 165 firms using Internet-based information technology to manage supply chain activities. The results provide management with an understanding of which supply chain I-IT functions maximize organizational performance within the context of their respective task environment and level of resource commitment.

2. LITERATURE REVIEW

Min and Galle (1999) defined electronic commerce as “an inter-organizational information system that is intended to facilitate business-to-business electronic communication, information exchange and transaction support through a web of either public access or private value-added networks.” Electronic commerce (EC) can be facilitated through a variety of media such as electronic data interchange (EDI), direct link-ups with suppliers, Internet, Intranet, Extranet, electronic catalog ordering, and e-mail. Much of the literature has investigated EDI, which, in a broad sense of electronic commerce, involves the movement of paper-based instruments through private dyadic electronic telecommunications channels (Kumar & Crook, 1999). With the advent of the Internet, many companies are migrating their information technology (IT) functions to the publicly accessible and cost effective World Wide Web as their preferred infrastructure for electronic commerce. Prior research has focused on the strategic benefits of private networks of electronic commerce such as electronic data interchange (EDI) (Clark & Stoddard, 1996; Angeles, Nath, & Hendon, 1998; Mukhopadhyay, Kekre, & Pokorney, 1998; Chatfield & Yetton, 2000; Ahmad & Schroeder, 2001).

The evolution of virtual markets, created by Internet-based information technology (I-IT), is an innovation that spans firm and industry
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